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Publication date:
2018

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):
Xiao, S. (2018). *Graphene-based integrated optoelectronic devices*. Abstract from EMN 2018, Chengdu, China.

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Graphene-based integrated optoelectronic devices

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With unique possibilities for controlling light in nanoscale devices, graphene has opened new perspectives to the nanophotonics community with potential applications in metamaterials, modulators, photodetectors, and sensors. In this talk, I will present our recent results on how we utilize two-dimensional materials to demonstrate novel integrated optoelectronic devices, e.g., graphene based silicon ring-resonator modulators [1], graphene plasmonic waveguide modulators [2], graphene plasmonic waveguide photodetector [3], and high-energy-efficiency graphene microheats [4].

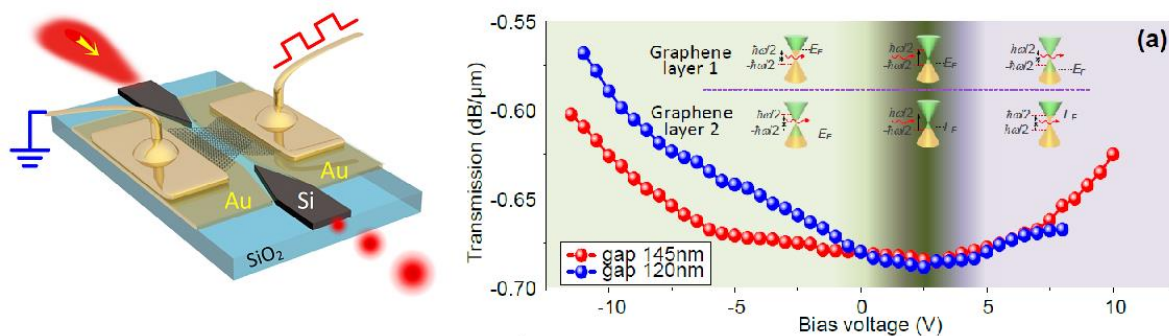


Fig. 1. (a) 3D schematic of the graphene plasmonic waveguide modulator; (b) Modulated transmission for 20-μm-long graphene plasmonic hybrid slot waveguides

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2. Y. Ding, et.al., *Nanoscale*, **9**, 15576 (2017).
3. Y. Ding, et. al., *Nano. Lett.*, **15**, 4393 (2015).
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5. S. Yan, et. al., *Nature Communications*, **8**, 14411 (2017).